

REMARKS

Applicants request favorable reconsideration of the subject application in view of the foregoing amendments and the following remarks.

Claims 1, 2, 4, 5, and 7 are pending in the present application, with Claims 1 and 4 being independent. Claims 1 and 4 are amended herein. Claims 3, 6, 9 and 8 are canceled herein without prejudice. Claims 1 and 4 have been amended. Support for these amendments can be found, at least, in paragraphs [0009], [0016], [0024], and [0039] of the specification.

Claims 1 and 3 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,976,907 (Shigeta et al.). Claims 4, 5, 7 and 9 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,407,145 (Lee). Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Shigeta et al. in view of U.S. Patent No. 6,765,277 (Chen et al.). Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of Chen et al.. Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee in view of U.S. Patent No. 6,271,900 (Li).

In response, while not conceding the propriety of the rejections, independent Claims 1 and 4 have been amended and Claims 3, 6, 8, and 9 have been canceled without prejudice. Applicants submit that as amended, independent Claims 1 and 4 are allowable for the following reasons.

Independent Claim 1 relates to a solid-state image pickup device comprising a photoelectric conversion portion, configured to generate signal electric charges in accordance with an amount of incident light, a plurality of color filters, and a flattening layer formed on the plurality of color filters.

Claim 1 has been amended to recite that the photoelectric conversion portion comprises first and second exposure regions. Claim 1 has also been amended to recite that the color filters comprise two adjacent color filters in the first exposure region forming a gap therebetween or overlapping each other, and two adjacent color filters in the second exposure region overlapping each other or forming a gap therebetween.

Claim 1 has also been amended to recite that a recess is formed on a surface of the flattening layer in the first exposure region in the event the two adjacent color filters in the first exposure region form a gap therebetween, and that a projection is formed on a surface of the flattening layer in the first exposure region in the event the two adjacent color filters in the first exposure region overlap each other. Claim 1 has been further amended to recite that a recess is formed on a surface of the flattening layer in the second exposure region in the event the two adjacent color filters in the second exposure region form a gap therebetween, and that a projection is formed on a surface of the flattening layer in the second exposure region in the event the two adjacent color filters in the second exposure region overlap each other.

Claim 1 has also been amended to recite that the thickness of the projections and recesses formed on the surface of the flattening layer in the first and second exposure regions is equal to or less than 0.2 μm . Finally, Claim 1 has been amended to recite that the flattening layer reduces the variation in the amount of incident light reaching the first and second exposure regions arising from differences in the gaps or overlapping of adjacent color filters in the first and second exposure regions.

Independent Claim 4 relates to a solid-state image pickup device comprising a photoelectric conversion portion configured to generate signal electric charges in accordance with an amount of incident light, a plurality of color filters, and a condenser lens.

Claim 4 has been amended to recite that the photoelectric conversion portion comprises first and second exposure regions. Claim 1 has also been amended to recite that the plurality of color filters comprises two adjacent color filters in the first exposure region overlapping each other, and two adjacent color filters in the second exposure region overlapping each other. Claim 4 has been further amended to recite that the condenser lens has a shape to cause incident light to avoid passing through regions of the color filters in which the two adjacent color filters in the first exposure region overlap each other and in which the two adjacent color filters in the second exposure region overlap each other, so as to pass through regions of the color filters having a uniform spectral characteristic, for condensing the incident light onto the photoelectric conversion portion.

These arrangements are designed to solve a problem that arises when using a divided exposure method, in which the exposure region is divided into a plurality of exposure regions, as discussed in paragraphs [0009], [0016], [0024], and [0039] of the specification. If color filters are positioned over each exposure region, there is the possibility that adjacent color filters over the two regions will not be spaced apart or overlap by the same amount in the two regions, thereby producing a variation in the amount of incident light on the photoelectric conversion element, which degrades image quality. This problem is solved by the inventions of Claim 1 and 4 by reducing the variations in the amount of incident light on the first and second exposure regions due to differences in the way adjacent color filters are positioned with respect to each other in the first and second exposure regions. One non-limiting example of adjacent color filters in different exposure regions is shown on the attached sketch, showing adjacent R, G, and B filters disposed in a grid pattern in two exposure regions.

In contrast, the patents to Shigeta et al. and Lee are not understood to disclose or suggest that two adjacent color filters in a first exposure region form a gap therebetween or overlap each other, and that two adjacent color filters in the second exposure region overlap each other or form a gap therebetween, as recited by amended Claim 1. In addition, these patents are not understood to disclose or suggest that a recess is formed on a surface of the flattening layer in the first exposure region in the event the two adjacent color filters in the first exposure region form a gap therebetween, and that a projection is formed on a surface of the flattening layer in the first exposure region in the event the two adjacent color filters in the first exposure region overlap each other, as recited by amended Claim 1. Further, these patents are not understood to disclose or suggest that a recess is formed on a surface of the flattening layer in the second exposure region in the event the two adjacent color filters in the second exposure region form a gap therebetween, and that a projection is formed on a surface of the flattening layer in the second exposure region in the event the two adjacent color filters in the second exposure region overlap each other, as recited by amended Claim 1. Moreover, since these patents are understood to fail to disclose or suggest the overlapping or spacing apart of adjacent color filters in first and second exposure regions, these patents also are not understood to disclose or suggest that the thickness of the projections and recesses formed on the surface of the flattening layer in the first and second exposure regions is equal to or less than 0.2 μm , as recited by amended Claim 1. Finally, these patents are not understood to disclose or suggest that the flattening layer reduces the variation in the amount of incident light reaching the first and second exposure regions, arising from differences in the gaps or overlapping of adjacent color filters in the first and second exposure regions, as also recited in amended Claim 1.

Turning to amended Claim 4, the patents to Shigeta et al. and Lee are not understood to disclose or suggest that a plurality of color filters comprises two adjacent color filters in a first exposure region overlapping each other, and two adjacent color filters in a second exposure region overlapping each other, or a condenser lens having a shape to cause incident light to avoid passing through regions of the color filters in which the two adjacent color filters in the first exposure region overlap each other and in which the two adjacent color filters in the second exposure region overlap each other, so as to pass through regions of the color filters having a uniform spectral characteristic, for condensing the incident light onto the photoelectric conversion portion, as recited by amended Claim 4.

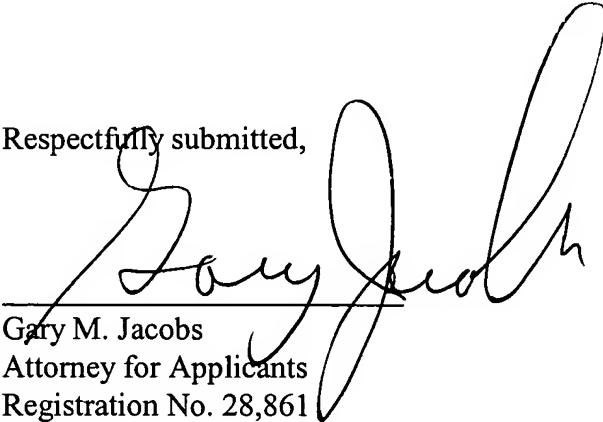
For these reasons, amended Claims 1 and 4 are not understood to be anticipated by the patents to Shigeta et al. and Lee.

The dependent claims are allowable for the reasons given for the independent claims and because they recite features that are patentable in their own right. Individual consideration of the dependent claims is respectfully solicited.

In view of the above amendments and remarks, the application is now in allowable form. Therefore, early passage to issue is respectfully solicited.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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